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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,207	03/22/2004	Lawrence J. Malone	022263-000310US	3292

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EXAMINER	
LE, LANA N	

ART UNIT	PAPER NUMBER
2685	

DATE MAILED: 11/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/807,207	MALONE ET AL.	
	Examiner	Art Unit	
	Lana N Le	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10-17* is/are rejected.

7)☒ Claim(s) *9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Preliminary Amendment

1. The preliminary amendment filed 07/22/04 has been received and made of record in the file and has been considered by the examiner.

Claim Objections

2. Claims 1 and 17 are objected to because of the following informalities:

- claim 1, line 4, after "signal as", "an RF" should be "the RF";
- claim 17, line 3, after "wherein", "the device" should be "the mobile device".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000.

Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1-5 and 14-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Hellberg (US 6,385,439).

Regarding claim 1, Hellberg discloses a method for communicating a radio frequency signal (radio frequency carrier signal; col 1, lines 4-7), comprising:

mixing via an up-converting mixer 18 (fig. 2 and hereafter) a baseband signal (I, Q output from quadrature baseband signal generator 12; col 3, lines 44-47) with a plurality of oscillator signals (from local oscillator LO 20; col 4, lines 15-20) with different phases (phase shifted local oscillator signals; col 5, line 65 - col 6, line 1) in an interleaving manner (by interleaving the multiple pulsed signals generated by corresponding phase shifted local oscillator signals to switch and mix with the filtered I, Q baseband signals within mixer 18 (see col 5, line 60 – col 6, line 12); and

communicating (via antenna 26) the mixed baseband signal (I, Q output from quadrature baseband signal generator 12) as an RF signal after the direct up-conversion to RF from baseband via mixer 18 (fig. 2).

Regarding claim 2, Hellberg discloses the method as recited in claim 1, wherein the method is carried out by a transmitter 10 (fig. 2; col 3, lines 27-28).

Regarding claim 3, Hellberg discloses the method as recited in claim 1, wherein Hellberg inherently disclose the oscillator signals include an oscillator signal frequency substantially equal to an RF signal frequency of the RF signal (wherein this a characteristic of a direct conversion transmitter; fig. 2; col 4, line 53 –col 4, line 22

wherein upconverter 18 mixes the amplified and filtered baseband signal directly to RF signal to be filtered and transmitted via antenna 26; fig. 2).

Regarding claim 4, Hellberg discloses the method as recited in claim 1, wherein Hellberg discloses the RF signal is modulated over a finite bandwidth due to the modulated RF signal being modulated with a carrier frequency over a broad range or over such a wide bandwidth as the broad range (col 4, lines 62-67).

Regarding claim 5, Hellberg discloses the method as recited in claim 1, wherein the oscillator signals have phase differences of 0, 90, 180, and 270 degrees (col 5, line 65 – col 6, line 1; fig. 5).

Regarding claim 14, Hellberg discloses the method as recited in claim 1, wherein a plurality of the baseband signals is provided including an in-phase baseband signal and a quadrature baseband signal (I, Q baseband signal; col 3, lines 44-47).

Regarding claim 15, Hellberg discloses a subsystem for transmitting a radio frequency signal via antenna 26 (fig. 2 and hereafter; radio frequency carrier signal; col 1, lines 4-7; col 3, lines 27-43), comprising:

means (upconverting mixer 18) for mixing a baseband signal (I, Q baseband signal; col 3, lines 44-47) with a plurality of oscillator signals (local oscillator signals from LO 20; col 4, lines 15-20) with different phases (phase shifted local oscillator signals; col 5, line 65 - col 6, line 1) in an interleaving manner (by interleaving the multiple pulsed signals generated by corresponding phase shifted local oscillator signals to switch and mix with the filtered I, Q baseband signals within mixer 18; col 5, line 60 – col 6, line 12); and

means (antenna 26) for transmitting the mixed baseband signal as an RF signal (col 3, lines 33-38).

Regarding claim 16, Hellberg discloses a subsystem for transmitting a radio frequency signal via antenna 26 (fig. 2 and hereafter; radio frequency carrier signal; col 1, lines 4-7; col 3, lines 27-43), comprising:

at least one mixer (18) for mixing a baseband signal (I, Q baseband signal; col 3, lines 44-47) with a plurality of oscillator signals (local oscillator signals from LO 20; col 4, lines 15-20) with different phases (phase shifted local oscillator signals; col 5, line 65 - col 6, line 1) in an interleaving manner (by interleaving the multiple pulsed signals generated by corresponding phase shifted local oscillator signals to switch and mix with the filtered I, Q baseband signals within mixer 18; col 5, line 60 – col 6, line 12).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hellberg (US 6,385,439) in view of Bartusiak (US 6,016,422).

Regarding claim 6, Hellberg discloses the method as recited in claim 1, wherein Hellberg doesn't disclose the mixing is carried out by a plurality of mixers. Bartusiak

discloses the mixing is carried out by a plurality of mixers 358 & 360 (col 8, lines 8-15; fig. 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a plurality of mixers in the method of Hellberg in order to maintain the in phase and quadrature components at the output of the upconversion by transmit I and Q mixers so that the in phase upconverted mixed signal pair maintain a phase relationship of a certain angle relative to the quadrature upconverted mixed signal pair as suggested by Bartusiak (col 8, lines 15-23).

Regarding claim 7, Hellberg and Bartusiak disclose the method as recited in claim 6, wherein Hellberg further discloses the oscillator signals are input to the mixers in the interleaving manner (by interleaving the multiple pulsed light signals generated by corresponding phase shifted local oscillator signals to switch and mix with the filtered I, Q baseband signals (see col 5, line 60 – col 6, line 12).

Regarding claim 8, Hellberg and Bartusiak disclose the method as recited in claim 7, wherein Hellberg further discloses the oscillator signals are input to the mixers in the interleaving manner by switching which oscillator signals are input to which mixers (see col 5, line 60 –col 6, line 12).

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hellberg (US 6,385,439) in view of Kim (US 6,064,664).

Regarding claim 12, Hellberg discloses the method as recited in claim 1, wherein Hellberg does not disclose the baseband signal is inverted using an interleaving operation. Kim discloses the baseband signal is inverted using an interleaving

operation (col 7, lines 38-44). It would have been obvious to one of ordinary skill in the art at the time the invention was made to invert the baseband signal using an interleaving operation by randomizing the errors in order to protect against burst errors by lowering the error rates of communication channels susceptible to burst errors which occur in clusters of bits as is suggested by Kim (col 1, lines 46-62; col 8, lines 42-44).

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hellberg (US 6,385,439) in view of Lynch (US 6,055,429).

Regarding claim 13, Hellberg discloses the method as recited in claim 1, wherein Hellberg does not disclose the baseband signal is routed to at least one mixer using an interleaving operation. Lynch discloses the baseband signal is routed to at least one mixer (112, 113) using an interleaving operation via 141 (col 9, lines 50-60; fig. 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to interleave the baseband signals of Hellberg in order to alleviate multipath fading which might occur by reducing the error rates of communication channels susceptible to burst errors as is well known in the art by scrambling the order of the bits.

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hellberg (US 6,385,439) in view of Takikawa (US 6,665,159).

Regarding claim 17, Hellberg discloses a transmitter (10; fig. 2; col 3, lines 38-43) comprising:

at least one mixer (18) for mixing a baseband signal (I, Q output from quadrature baseband signal generator 12; col 3, lines 44-47) with a plurality of oscillator signals (oscillator signals from LO 20) with different phases (phase shifted local oscillator signals) in an interleaving manner (by interleaving the multiple pulsed signals generated by corresponding phase shifted local oscillator signals to switch and mix with the filtered I, Q baseband signals within mixer 18; col 5, line 60 – col 6, line 12).

Hellberg does not explicitly disclose the system, comprising: a mobile device in communication with a wireless communication network; wherein the device includes an integrated circuit including the at least one mixer.

Takikawa discloses a mobile device (mobile terminal device) in communication with a wireless communication network (base stations in a mobile communication system); wherein

the device (mobile terminal device) includes an integrated circuit (IC containing a transmitter/receiver line circuits) including at least one mixer 13 (col 1, lines 15-24; col 3, line 34-44). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the transmitter of Hellberg be implemented in a mobile terminal device including an integrated chip containing a transmitter section in order to have miniaturization of the wireless communication mobile terminal for convenience to the user so he/she doesn't need to carry a bulky wireless phone as suggested by Takikawa (col 3, line 34-35).

Allowable Subject Matter

10. Claims 9-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 9, Hellberg and Bartusiak disclose the method as recited in claim 8, wherein Hellberg, Bartusiak, and the cited prior art do not disclose the switching occurs at a rate that is faster than a bandwidth of the RF signal.

Regarding claim 10, Hellberg and Bartusiak disclose the method as recited in claim 8, wherein Hellberg, Bartusiak, and the cited prior art fail to disclose the switching occurs in a substantially random manner since Hellberg teaches the switching occurs in a defined sequence (col 5, lines 13-21). Therefore, it would not be obvious to modify the Hellberg reference to make the switching occur in a random manner which would destroy Hellberg's teaching.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Razavi (RF Microelectronics, copyright 1998), Prentice-Hall, Inc., page 103.
- Frodigh et al (US 6,125,148) Method For Demodulating Information In A Communication System That Supports Multiple Modulation Schemes.

- Chen (US 5,509,033), Quadrature Overlapping Modulation System.
- Wendt et al (US 5,194,823), Modulation Means for an RF Power Amplifier.
- Hustig et al (US 4,677,686), Low Noise Architecture For A Direct Conversion Transmitter.
- Shea (US 5,235,340), Frequency Domain Polarimeter.
- Faber (US 5,710,983) Channel Selecting System Utilizing A Random Number Generator Having A Shift Register, Switches And Boolean Function Circuit To Randomly Select A Channel Frequency.
- Sugar et al (US 6,728,517), Multiple-Input Multiple-Output Radio Transceiver.
- von Pieverling et al (US 6,016,422), Phase Regulating Circuit.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana N Le whose telephone number is (703) 308-5836. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F Urban can be reached on (703) 305-4385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lana Le

November 2, 2004